

# **CARIBOU ACRES SUBDIVISION (PWS 6030005) SOURCE WATER ASSESSMENT FINAL REPORT**

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**November 13, 2000**



## **State of Idaho Department of Environmental Quality**

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for the Caribou Acres Subdivision* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Caribou Acres Subdivision water system consists of two well sources. Well #1 is located east of Mink Creek Road and Well #2 is located in a canyon west of Caribou Road on private property. The dates of construction for both wells are unknown. Total coliform bacteria exceeded the Maximum Contaminant Level in the water sampling efforts of October 1992, August 1996, and November 1999. Nitrate concentrations were also detected, though well below the established Maximum Contaminant Level. Water quality test records copper in the drinking water at 2.03 mg/L (action level is 1.3 mg/L) in October 1999. The presence of the copper is most likely the result of copper piping. No potential contaminant sources exist within the delineation capture zones. The final susceptibility ranking for Well #1 is high for microbial contaminants and moderate for inorganic contaminants, volatile organic contaminants, and synthetic organic contaminants. Well #2 rated high for microbial contaminants and moderate for inorganic contaminants, volatile organic contaminants, and synthetic organic contaminants.

For the Caribou Acres Subdivision, source water protection activities should focus on implementation of practices aimed at keeping the distribution system free of microbial contaminants. Disinfection should be considered if microbial problems arise and/or persist. A 2000 sanitary survey disapproved Well #2 because of no well vent. Fixing this problem will improve the system construction score and lower the potential for contamination. Land uses within most of the source water assessment area for Well #1 is beyond the control of Caribou Acres Subdivision. Therefore, partnerships with state and local agencies should be established to ensure future land uses are protective of ground water quality. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Portneuf Soil and Water Conservation District, and the Natural Resources Conservation Service.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies please contact Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR CARIBOU ACRES SUBDIVISION,

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was

**It is important to review this information to understand what the ranking of this source means.**

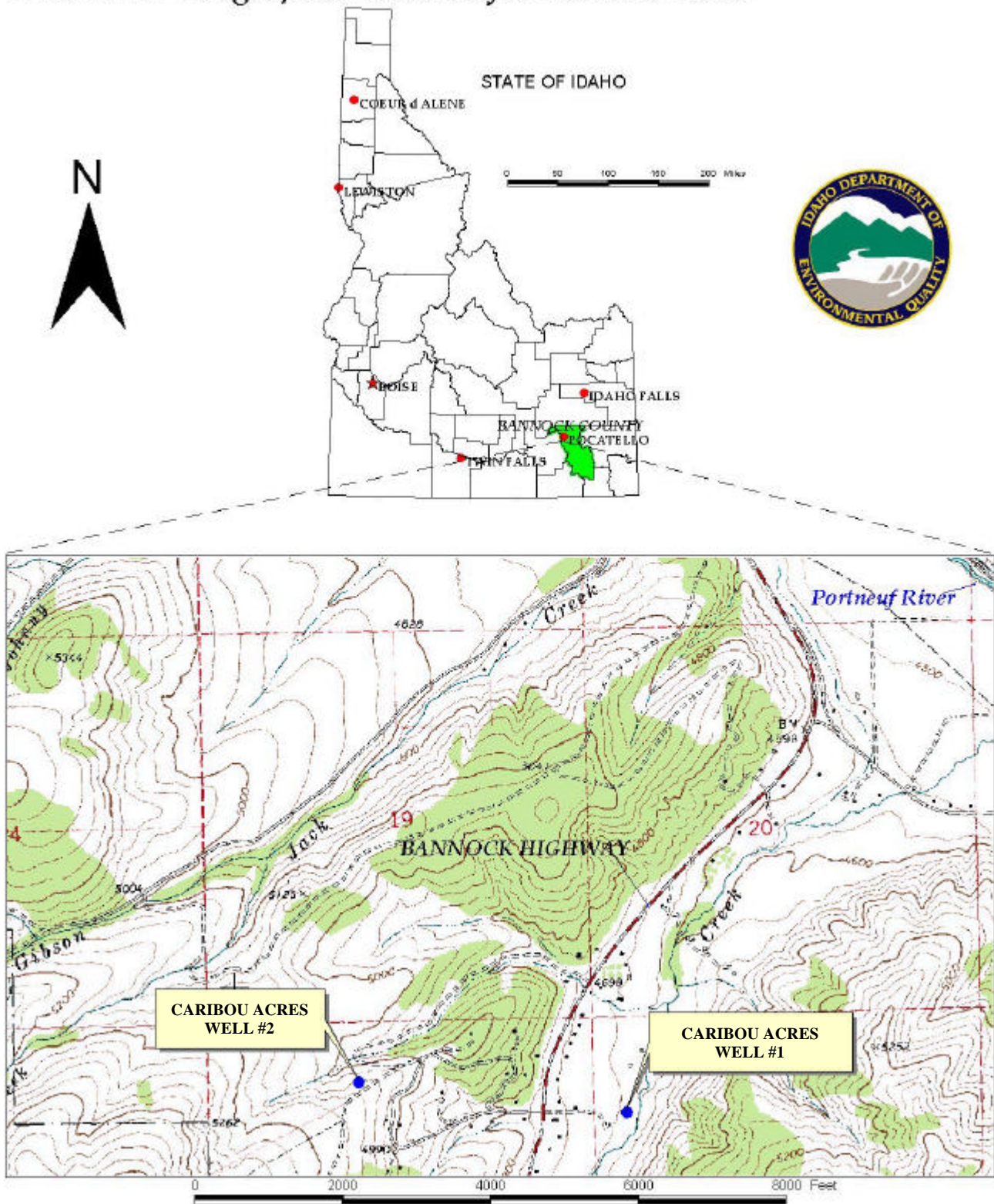
significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

**FIGURE 1. Geographic Location for Caribou Acres**



## **Section 2. Conducting the Assessment**

### **General Description of the Source Water Quality**

The Caribou Acres Subdivision is a community public drinking water system serving approximately 200 persons. The water system is located south of Pocatello in Bannock County (Figure 1). The water system consists of two well sources. Total coliform bacteria exceeded the Maximum Contaminant Level (MCL) in the water sampling efforts of October 1992, August 1996, and November 1999. The presence of the copper is mostly likely the result of copper piping in the distribution system. At this time, there appears to be no primary water quality issues facing the water system.

### **Defining the Zones of Contribution--Delineation**

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Dr. John Welhan of the Idaho Geological Survey used analytical models approved by the EPA to determine the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) time of travel zone for the wells.

In this situation, where insufficient information was available, the capture zones were delineated using a modified calculated fixed radius method. This method utilized information from nearby well-specific information where available, such as well discharge and nearby well development tests to calculate the radial time-of-travel distances for capture zone areas represented by fixed radii. The actual data used by Dr. Welhan in determining the zone of contribution are available upon request.

### **Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases did not identify potential sources of contamination within the delineation areas.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

### **Contaminant Source Inventory Process**

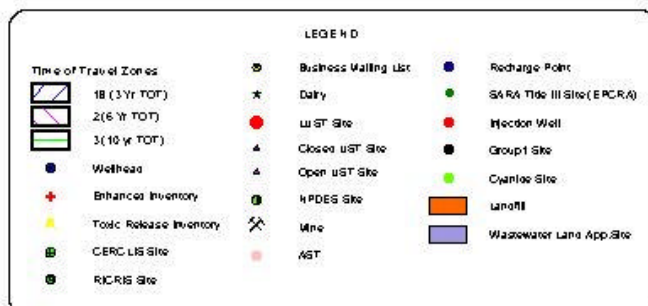
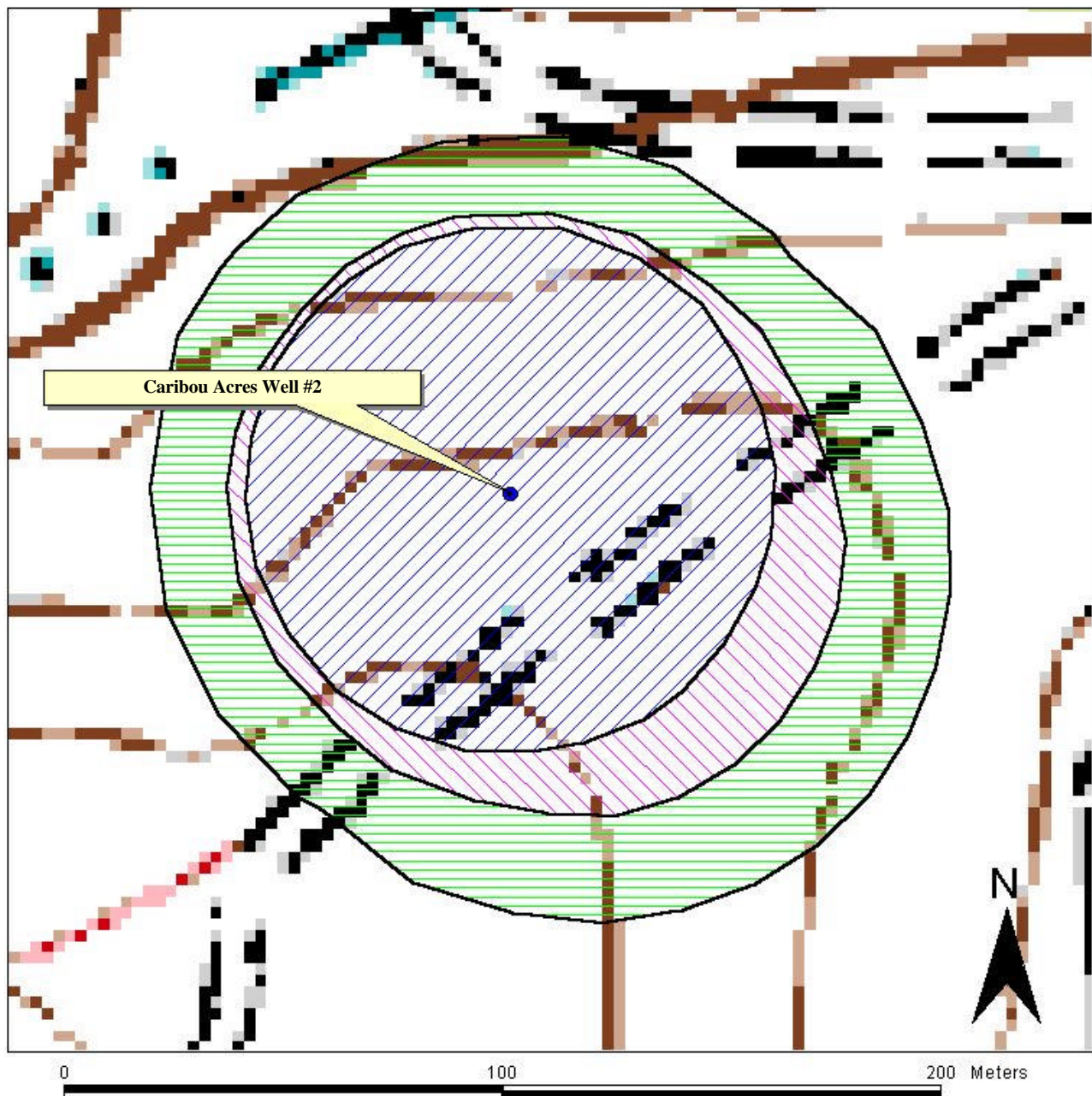
A contaminant inventory of the study area was conducted during the spring and summer of 2000. This involved identifying and documenting potential contaminant sources within the Caribou Acres Subdivision Source Water Assessment Area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. No potential contaminant sources were found within the delineated source water areas.







FIGURE 3 - CARIBOU ACRES: Delineation Map



**PWS #6030005**  
**CARIBOU ACRES WELL #2**

### **Section 3. Susceptibility Analyses**

The susceptibility of the sources to contamination were ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

#### **Hydrologic Sensitivity**

Hydrologic sensitivity was moderate for Well #1 and Well #2 (see Table 1). The soils in the delineation are considered to be in the poor to moderate drainage class. The moderate score for both wells account for insufficient well log data to determine the make up of the vadose zone (zone from land surface to the water table) and whether 50 feet of low permeability units are present between the surface and the water-producing zone of the aquifer.

#### **Well Construction**

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current public water system (PWS) construction standards are being met.

The Caribou Acres Subdivision drinking water system consists of two well sources that extract ground water for domestic and irrigation uses. For Well #1 the system construction score rating was moderate (Table 1). The score reflects insufficient well log data to determine if the casing and annular seal extend into a low permeable unit. For Well #2 the system construction score rating was high (Table 1). This accounts for insufficient well log information to determine if the casing and annular seal extend into a low permeable unit, two important aspects of proper well construction. The well was also given an additional point because it is not protected against surface flooding.

The sanitary survey indicates Well #1 is approximately 85 feet deep with an 8-inch diameter casing. No information was provided regarding the static water level or depth of casing. Well #2 is equipped with a 4-inch diameter casing that extends approximately 200 feet below ground surface (bgs) and the depth of the pump estimated at 260 feet bgs. The survey also indicates that the surface seal and wellhead of Well #1 are in compliance with DEQ requirements. Both wells are located outside the 100-year floodplain.

The wells were given an additional point because it could not be determined if they meet current well construction standards. The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems (PWSs) to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Various aspects of the standards can be assessed from well logs. The standards state that screen will be installed and have openings based on sieve analysis of the formation. Standard 3.2.4.1 requires all PWSs to have yield and drawdown tests that last “24 hours or until stabilized drawdown has continued for six hours at 1.5 times the design pumping rate” (Recommended Standards for Water Works, 1997).

### Potential Contaminant Source and Land Use

Well #1 rated moderate for inorganic chemicals (IOCs) (i.e. nitrate, copper) and low for, volatile organic chemicals (VOCs) (i.e. petroleum products), synthetic organic chemicals (SOCs) (i.e. pesticides), and microbial contaminants. Well #2 rated low for IOCs, VOCs, SOCs, and microbial contaminants.

Total coliform bacteria exceeded the Maximum Contaminant Level (MCL) in the water sampling efforts of October 1992, August 1996, and November 1999. For Well #1, the dominant land use in the delineated source water area is irrigated agricultural. For Well #2 the dominant land use in the delineated source water area is residential development.

### Final Susceptibility Rating

A detection above a drinking water standard Maximum Contaminant Level (MCL), any detection of a VOC or SOC, or a detection of total coliform or fecal coliform will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. In this case, Well #1 rated high for microbial contaminants and moderate for IOC contaminants, VOC contaminants, and SOC contaminants. Well #2 rated high for microbial contaminants and moderate for IOC contaminants, VOC contaminants, and SOC contaminants.

**Table 1. Summary of Caribou Acres Subdivision Susceptibility Evaluation**

Well	Susceptibility Scores									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	L	L	L	M	M	M	M	H*
Well #2	M	L	L	L	L	H	M	M	M	H*

**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility**

**IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

**H\* = Indicates source automatically scored as high susceptibility due to presence of total coliform in the finished drinking water.**

## **Susceptibility Summary**

At this time, the system does not appear threatened by VOC or SOC contaminants. However, the system currently exceeds the action level for copper. The sanitary survey states the water system must continue to monitor the copper levels in the water and provide customers with information regarding the health effects of excessive copper in the drinking water. The system has three total coliform bacteria MCL violations since 1992. This total coliform bacteria MCL violations account for the high rating in the final susceptibility ranking.

## **Section 4. Options for Source Water Protection**

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For the Caribou Acres Subdivision, source water protection activities should focus on implementation of practices aimed at keeping the distribution system free of microbial contaminants. Disinfection should be considered if microbial problems arise and/or persist. A 2000 sanitary survey disapproved Well #2 because of no well vent. Fixing this problem will improve the system construction score and lower the potential for contamination. Land uses within most of the source water assessment area for Well #1 is beyond the control of Caribou Acres Subdivision. Therefore, partnerships with state and local agencies should be established to ensure future land uses are protective of ground water quality. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

## **Assistance**

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office      (208) 236-6160

State DEQ Office      (208) 373-0502

Website: <http://www2.state.id.us/deq>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-800-962-3257 for assistance with wellhead protection strategies.



## References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environment Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Environmental Quality. 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Department of Environmental Quality. 2000. *Sanitary Survey Report for Caribou Acres Subdivision*

Welhan, J. 2000. Idaho Geologic Survey. *SWA Capture Zone Delineations, Lower Portneuf and Marsh Valleys*

## POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks)** – Sites with aboveground storage tanks.

**Business Mailing List** – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS** – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as “Superfund” is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site** – DEQ permitted and known historical sites/facilities using cyanide.

**Dairy** – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well** – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain** – This is a coverage of the 100-year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area** – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill** – Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area** – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System)** – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas** – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point** – This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS** – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities)** – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank)** – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads** – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

## Attachment A

### Caribou Acres Subdivision Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

1. System Construction		SCORE			
	Drill Date				
	Driller Log Available	NO			
	Sanitary Survey (if yes, indicate date of last survey)	YES	2000		
	Well meets IDWR construction standards	NO	1		
	Wellhead and surface seal maintained	NO	1		
	Casing and annular seal extend to low permeability unit	NO	2		
	Highest production 100 feet below static water level	NO	1		
	Well located outside the 100 year flood plain	NO	1		
Total System Construction Score			6		
2. Hydrologic Sensitivity					
	Soils are poorly to moderately drained	YES	0		
	Vadose zone composed of gravel, fractured rock or unknown	YES	1		
	Depth to first water > 300 feet	NO	1		
	Aquitard present with > 50 feet cumulative thickness	NO	2		
Total Hydrologic Score			4		
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
	Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2
	Farm chemical use high	NO	0	0	
	IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
	Contaminant sources present (Number of Sources)	NO	0	0	0
	(Score = # Sources X 2 ) 8 Points Maximum		0	0	0
	Sources of Class II or III leacheable contaminants or	NO	0	0	
	4 Points Maximum		0	0	
	Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0
	Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		0	0	0	0
Potential Contaminant / Land Use - ZONE II					
	Contaminant Sources Present	NO	0	0	0
	Sources of Class II or III leacheable contaminants or	NO	0	0	
	Land Use Zone II	Less than 25% Agricultural Land	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0
Potential Contaminant / Land Use - ZONE III					
	Contaminant Source Present	NO	0	0	0
	Sources of Class II or III leacheable contaminants or	NO	0	0	
	Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0
Cumulative Potential Contaminant / Land Use Score		2	2	2	2
4. Final Susceptibility Source Score		10	10	10	11
5. Final Well Ranking		Moderate	Moderate	Moderate	High



1. System Construction		SCORE			
Drill Date	NO				
Driller Log Available	YES	2000			
Sanitary Survey (if yes, indicate date of last survey)	NO	1			
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	NO	2			
Casing and annular seal extend to low permeability unit	NO	1			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain					
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		4			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED PASTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2 ) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	0	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		8	4	4	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		3	2	2	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		2	1	1	0
Cumulative Potential Contaminant / Land Use Score		14	8	8	5
4. Final Susceptibility Source Score		11	10	10	10
5. Final Well Ranking		Moderate	Moderate	Moderate	High